

July 28, 1954

Dr. Carl C. Lindegren
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Dear Dr. Lindegren:

Dr. Lederberg gave me your manuscript "The effect of misassortment of the centromere on tetrad analysis" several days ago and Branch Howe, who is working on this problem, and I went over it.

Howe has some data which indicate strongly that slippage occurs in about .5% of the asci. He has no evidence for any centromere misassortment, and the data show that it cannot be very frequent.

He has analyzed 1200 asci in which at least one member of 3 or more spore pairs germinated. The cross was

A	I	ad	II	.	III	vis	.	ri	X	wild type
	4.4		2.2		6.1			1.0		

There were 6 cases of apparent 2-strand double crossovers in regions II and III, but 4 of these were accompanied by second division segregation for ri and hence were in all probability non-crossovers with nuclear transposition (slippage of spindle overlap). One other instance of almost certain slippage was detected by the manner of segregation of a modifier of vis. No other double crossovers were accompanied by second division segregation for ri. These 5 probably represent all the transpositions, since only one single crossover in regions II or III was accompanied by second division segregation for riboflavin and this was not such as to allow a simple interpretation if interchange of adjacent nuclei had occurred.

As for centromere misassortment, it could not have occurred with any great frequency in this experiment; otherwise he would have found an excess of apparent 2-strand doubles in regions II and III unaccompanied by second division segregation for ri. Since only 2 were found altogether, this doesn't leave much room for misassortments, since presumably some legitimate 2-strand doubles do occur.

The total data show:

	I,II	I,III	II,III	Total doubles
2-strand	0	3	2	5
3-strand	1	8	2	11
4-strand	1	1	2	4

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This offers no evidence for chromatid interference, and suggests that your excess of 2-strand doubles in regions II and III may have been due to nuclear transposition. However, neither this nor centromere misassortment would lead to an excess of doubles in regions I and IV such as you reported. Howe plans to continue his experiments with another marker to the right of vis.

I haven't any specific comments on your manuscript. Not having heard Perkins talk, I found it hard to understand. My guess is that Perkins made the correction from 15:7:6 to 15:12:6 that you refer to on page 4 by adding the 5 quadruple crossovers to this class, which is where they would belong if they were the results of misassortment.

I checked your analysis of the triples and quadruples in table 1 and agree with them, except for the revision mentioned on the bottom of page 2, which I don't understand. I assume that this is ascus number 6129.

In Howe's data all of the slippages resulted in asymmetrical spore arrangements. If nuclear transposition can involve only the two center nuclei at meiosis II, only asymmetrical arrangements should be found. I note that it requires the interchange of non-adjacent spore pairs to account for some of your quadruples by slippage (6132, 6091, 2958) though not for the triples (3243, 3249, 3150, 2968).

Enclosed is a copy of the abstract which Howe sent in for the Genetics Society meetings.

Sincerely,

James F. Crow

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